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1 CLAIMS

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- 4 1. A method of transmitting data in a borehole, the  
5 method comprising providing an electric signal  
6 representative of the data to be transmitted,  
7 converting said electric signal into a sonic  
8 signal and propagating said sonic signal along an  
9 elongate member, said data being transmitted from  
10 one side to the other of a physical obstruction in  
11 said elongate member, the conversion of the  
12 electric signal into the sonic signal being  
13 effected at a location on said one side;  
14 characterised in that said sonic signal is  
15 converted into an electrical signal on said other  
16 side of said obstruction and said data is stored  
on said other side for subsequent retrieval.
- 17
- 18 2. A method according to claim 1, in which the  
19 subsequent retrieval is effected by a pick-up tool  
20 lowered down the borehole to a location adjacent  
21 the obstruction.
- 22
- 23 3. A method according to claim 1, in which conversion  
24 from the electric signal to the sonic signal  
25 includes digital modulation of a carrier frequency  
26 in the range 100 Hz to 10 kHz.
- 27
- 28 4. A method according to claim 1, in which the sonic  
29 transmission is effected by longitudinal  
30 vibration.
- 31
- 32 5. A method according to claim 1, in which the  
33 elongate member is a drill stem, the obstruction  
34 is a shut-in valve in the drill stem, and the data

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1 comprises pressure-versus-time in the drill stem  
2 beneath the shut-in valve.

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4. Apparatus for transmitting data in a borehole, the  
5 apparatus comprising a transmitter and a receiver;  
6 the transmitter including means for converting  
7 data parameters into an electric signal and first  
8 transducer means responsive to said electric  
9 signal to generate an acoustic signal, the first  
10 transducer means being adapted for physical  
11 coupling to an elongate member extending along the  
12 borehole whereby the acoustic signal is propagated  
13 in said elongate member; the receiver comprising  
14 second transducer means adapted for physical  
15 coupling to said elongate member to produce an  
16 electrical output corresponding to said acoustic  
17 signal, and signal processing means connected to  
18 receive said output and operative to process the  
19 data into a condition for onward transmission;  
20 characterised in that said signal processing means  
21 includes memory means for storing received data,  
22 and means for transferring data from the memory  
23 means to a pick-up tool lowered to an adjacent  
24 location in the borehole.
- 25
26. Apparatus according to claim 6 for use in  
27 transmitting data from one side to the other of an  
28 obstruction in said elongate member, the first  
29 transducer means being coupled, in use, to the  
30 elongate member at a location on said one side of  
31 the obstruction, and the second transducer means  
32 being coupled, in use, to the elongate member at  
33 the other side of the obstruction.
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1 8. Apparatus according to claim 6, in which the first  
2 transducer means is a magnetostrictive transducer  
3 adapted to be mounted to the elongate member to  
4 produce longitudinal sonic vibrations in it.

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6 Sub 9.  
7 F2 8  
9  
10 Apparatus according to claim 7, in which the data  
parameter converting means is a fluid pressure  
transducer for monitoring fluid pressure below  
said obstruction.

11 10. Apparatus according to claim 6, in which said  
12 second transducer means comprises a mechanical  
13 bandpass filter and a piezoactive element mounted  
14 in series on the elongate member.

15  
16 11. Apparatus according to claim 6, in which the  
17 signal processing means includes electronic filter  
18 means.

19  
20 12. Apparatus according to claim 6, in which the  
21 pick-up tool includes further memory means in  
22 which the data may be stored until the pick-up  
23 tool is returned to the surface.

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25 13. Apparatus according to claim 6, in which the  
26 pick-up tool includes means for transmitting the  
27 data to the surface via a cable.

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